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Reptiles and amphibians of the Saudi islands in the Arabian Gulf

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Abstract

The herpetofauna of nine Saudi Arabian islands in the Arabian Gulf was studied. A total of 20 species of amphibians and reptiles within 12 families was reported. The number of species per island ranged from one in four islands to 11 in Tarout Island and tended to increase with island area. The colonization of species was made possible by human introduction, especially of geckos. A classification based on species presence/absence data ranked the islands according to their similarity, geographical location, size, and human use, which influenced reptile communities. A comparison between the reptiles on other islands belonging to the United Arab Emirates, Kuwait, and Iran in the Arabian Gulf was also presented.

Key Words

Arabian Gulf, biogeography, distribution, diversity, herpetofauna, islands

Introduction

The Arabian Gulf was formed 8,000 to 12,000 years ago. It is about 990 km in length and has a total surface area of 251,000 km^2, with an average depth of 50 m (Saudi Geological Survey 2012). It underwent frequent episodes of being filled and emptied during glacial and interglacial periods in the Quaternary (Mahmoodi 1988). Although approximately 130 islands in the Arabian Gulf are considered part of Saudi Arabia, only 29 are of considerable size, with total areas ranging from about 58 km^2 (Abu Ali Island) to approximately 0.01 km^2 (Al Haiza Island) (Saudi Geological Survey 2012). Most of the Kingdom's islands in the Arabian Gulf are flat and low-lying, with elevations generally not exceeding 13 m.

The reptile fauna of the Saudi Arabian islands in the Arabian Gulf remains poorly documented, and no data are available on amphibians. Martens (1996) recorded reptiles from only two islands (Abu Ali and Jana), and no comprehensive surveys have since been carried out. By comparison, islands in the Red Sea have received considerably more research attention. The reptiles of the Farasan Archipelago have been extensively studied by several authors (Mertens 1965; Gasperetti 1988; Schätti and Gasperetti 1994; Cunningham 2010; Masseti 2014). Cunningham (2010) listed 10 species of terrestrial reptiles from Farasan Island based on both historical and contemporary records. Two endemic species have also been described from the archipelago: *Platyceps insulanus* from Sarso Island (Martens 1996) and *Hemidactylus farasani* from Farasan Island (Šmíd et al. 2023). In the Arabian Gulf, nine species of terrestrial reptiles were reported from 13 islands in the Abu Dhabi Emirate, United Arab Emirates (UAE) (Soorae 2004), and 13 species were recorded from Sir Bani Yas Island in the UAE (Bourquin 2011). Ten species of reptiles were reported

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from Qeshm Island, Iran (Hosseinian Yousefkhan et al. 2013). Amr et al. (2021) reported 10 species of reptiles from five Kuwaiti islands.

The present study reports on the diversity and species richness of reptiles and amphibians in nine islands of Saudi Arabia in the Arabian Gulf with a comparison with other islands in the Arabian Gulf belonging to Kuwait, the United Arab Emirates, and Iran.

Materials and methods

Field methodology

Reptiles and amphibians were either collected or observed during the study period that extended from August 2024 to May 2025 through 13 field visits to nine islands. Collected specimens were deposited at Taibah University, Department of Biology, Al-Madinah Al Munawwarah, under the Islands Reptiles Collection (IRC). Field trips were carried out and covered nine islands (Table 1). Observed reptiles and amphibians were based on actual observations or through images sent to us by local residents. Reptile specimens held at the King Fahd University of Petroleum and Minerals (KFUPM) collection were examined and included in the study. Most collected reptiles were examined, identified, and then released at the site of collection. A survey effort of approximately four to five hours was conducted on each island, for a total of 51 hours of fieldwork by two persons during day and nighttime.

Study area

Nine Saudi Arabian islands in the Arabian Gulf were surveyed for the presence of reptiles and amphibians (Fig. 1). Table 1 shows the total surface area and the coordinates for each of the studied islands.

Abu Ali Island

This is the largest island of the Saudi islands in the Arabian Gulf, with a total area of 59.3 km² and a maximum length of 24.3 km (Fig. 2A). It is connected with the mainland by a causeway and is also connected to Batinah Island. The island suffers from fragmentation due to the construction of roads. Pollution caused by solid waste (plastic, wood, rubble, old huts) is widespread across the island. The island consists mainly of sabkhahs and sand sheets. Most of the vegetation is considered halophytes (*Suaeda vermiculata* and *Zygophyllum mandavillei*). Two carnivores were reported from the island: the Golden Jackal, *Canis aureus*, and the Red Fox, *Vulpes vulpes*.

Tarout Island

This is the third largest island, with its size being about 20.3 km² and its maximum length 6 km (Fig. 2F). It is connected to the Qatif mainland coast by three causeways. Farms with palm groves are common. The island was inhabited about 5,000 years ago. A large castle witnesses the history of the island. The flora is dominated by halophytic species, including mangroves. Many of the drainage canals from the farms are home to frogs and freshwater turtles. These canals are currently being reclaimed, posing a significant threat to the loss of these animals.

Az-Zakhnuniyyah Island

The total area of this island is 13.35 km² and about 1.5 km east of the coastline. It is characterized by the presence of sand dunes, salt marshes on the western side, sabkhas toward the southern part of the island, and clay soils (Fig. 2E). Fifty plant species were reported from this island, dominated by *Halopeplis perfoliata* and *Suaeda vermiculata* in the salt marshes, *Limonium axillare* and *Zygophyllum mandavillei* in sabkhas, and *Cyperus conglomeratus* and *Pennisetum divisum* in the sand dunes (Al-Taisan 2022). The island is one of the largest habitats for the Socotra Cormorant, *Phalacrocorax nigrogularis*, in the Arabian Gulf (Al Ghazzawy et al. 2009). Gerbil burrows are common, and *Gerbillus cheesmani* have been observed in large numbers in the sand dunes west of the island. *Vulpes vulpes* has also been observed.

Table 1. Surveyed islands for the occurrence of reptiles and amphibians. Latitude (N) and longitude (E) are given.

Locality	Survey effort (hrs)	Distance from mainland (km)	Area (km²)	Coordinates
Abu Ali	10	8.33	59.3	27.327278°N, 49.475931°E
Al Fanateer	4	1.5	0.3	27.144111°N, 49.598975°E
Al-Juraid	4	45	0.2	25.444014°N, 49.730997°E
Az-Zakhnuniyyah	6	1.5	13.35	25.561464°N, 50.323594°E
Al-Huwaylat	4	3.70	0.1	26.546964°N, 50.009328°E
Jana	4	37.23	0.2	27.368800°N, 49.898425°E
Karan	6	57.41	1	27.717442°N, 49.825214°E
Kareen	4	54.63	0.1	27.368800°N, 49.898425°E
Tarout	9	0.10	20.3	26.582531°N, 50.063781°E

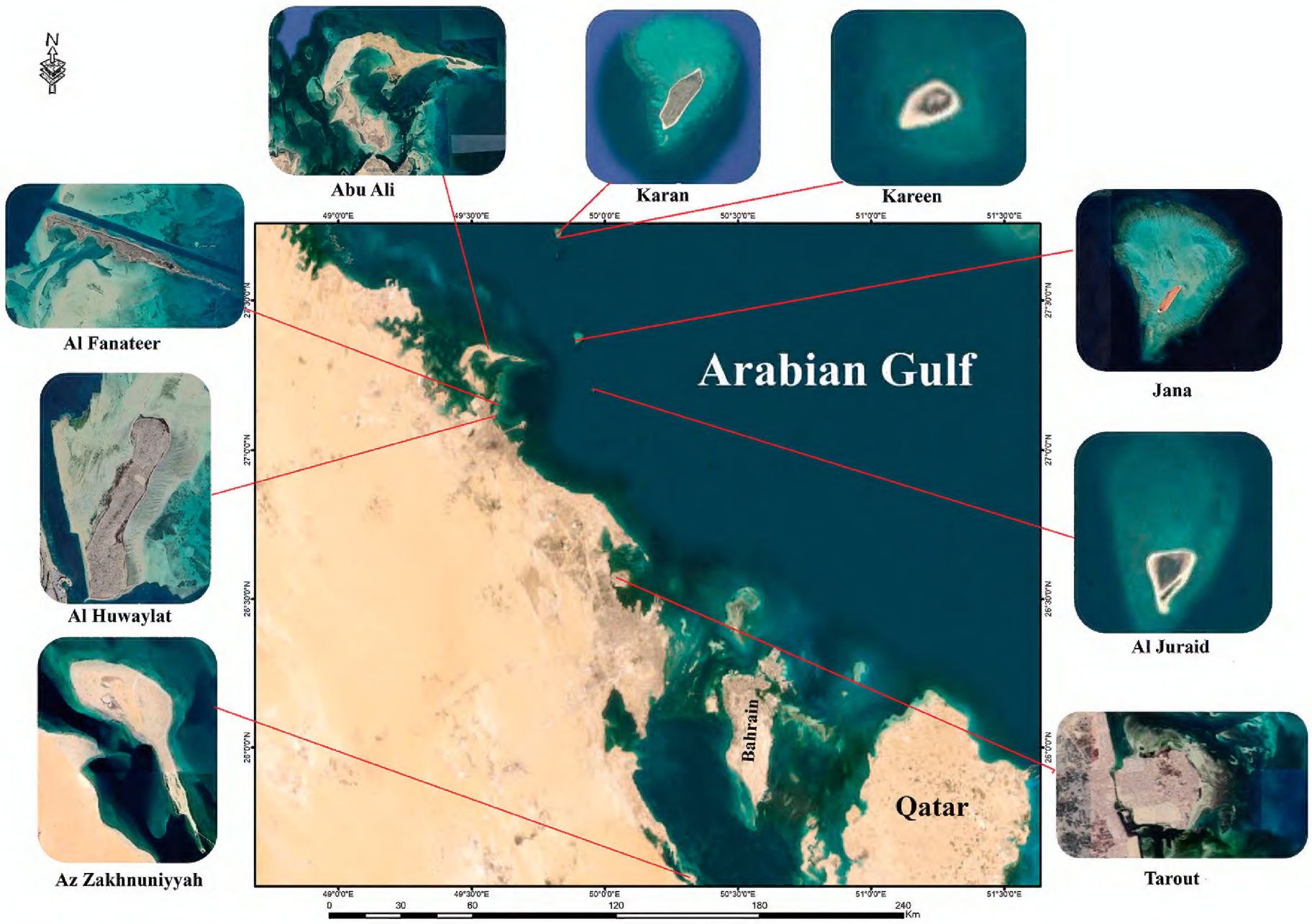

Figure 1. Map showing the surveyed island in the Arabian Gulf.

Al-Juraid Island

This is a small island with 0.2 km² in total area and approximately 45 km from the mainland. The surface is covered by sand and is vegetated mainly with dense *Suaeda vermiculata* and *Salsola baryosma* bushes (Fig. 2D). It is surrounded by extensive coral reefs. Al-Juraid Island serves as a nesting ground for the Green Sea Turtle (*Chelonia mydas*), with individuals visiting the island regularly throughout the breeding season (June–October). It hosts a large population of the White-cheeked Tern, *Sterna repressa*.

Al-Huwaylat Island

This is a small island with 0.1 km² in total area (Fig. 2B). It is a longitudinal sandy island with a flat surface covered by bushes such as *Herniaria hemistemon* and *Anabasis setifera*. There are a few colonies of the Lesser Crested Tern, *Thalasseus bengalensis*.

Al Fanateer Island

A longitudinal sandy island with a flat surface and a total area of 0.3 km² covered by bushes of *Arthrocnemum macrostachyum*, *Herniaria hemistemon*, and *Anabasis setifera* (Fig. 2C). A small rocky part is located at the edge of the northeastern side of the island. It hosts colonies of the Lesser Crested Tern, *Thalasseus bengalensis*.

Jana Island

This is a small island with about 0.2 km² in total area and 1 km as a maximum length. It is covered by sand with halophytic flora such as *Suaeda vermiculata* and *Salsola baryosma*. Both the Hawksbill Turtle and the Green Turtle nest on the island from June to October.

Kareen Island

This is one of the smallest islands, with an area of approximately 0.1 km² (about 312 m × 251 m). It has a narrow sandy beach vegetated mainly with *Suaeda vermiculata* and *Salsola baryosma*. Both the Hawksbill Turtle (*Eretmochelys imbricata*) and the Green Turtle (*Chelonia mydas*) nest on the island.

Karan Island

This island measures about 1 km² and about 2 km in maximum width. It is considered one of the largest coral islands and has a bare beach platform. It is vegetated primarily with *Suaeda vermiculata* and *Salsola baryosma* bushes. The island hosts the largest breeding population of the Lesser Crested Tern, *Thalasseus bengalensis*, in addition to other bird species. It is also the main breeding site for both the Hawksbill Turtle and the Green Turtle.

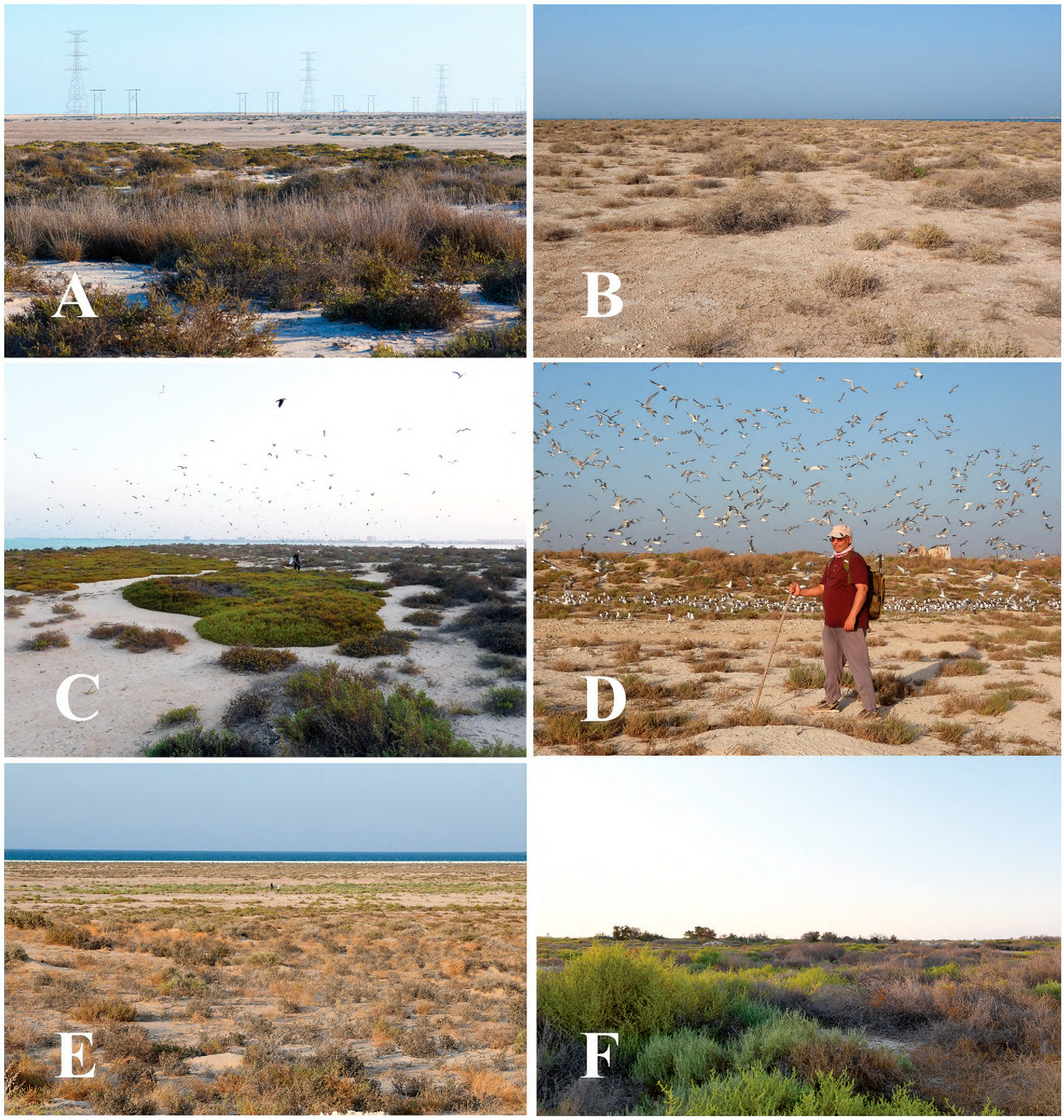

Figure 2. Illustrative pictures of the main characteristics of Arabian Gulf islands. **A.** Abu Ali Island; **B.** Al-Huwaylat Island; **C.** Al Fanateer Island; **D.** Al-Juraid Island; **E.** Az-Zakhnuniyyah Island; **F.** Tarout Island.

Species richness and diversity

Species diversity is represented as the total number of recorded species within each island (species richness), the total number of individuals (abundance), and diversity using the Simpson Diversity Index ($D = 1/\Sigma(pi)^2$), where Pi is the relative representation of the ith species in the sample (Simpson 1949). Simpson's diversity index ranges from 0 to 1, with 0 representing infinite diversity and 1 representing no diversity or absence of diversity (1 species). Thus, the larger the value of D, the lower the diversity. We tested for correlations between species richness and island area and distance from the mainland using Pearson's correlation coefficient in Excel. Species presence across the nine islands was used to classify the islands based on the similarity of reptile species composition using cluster analysis (Bray–Curtis similarity measure, UPGMA algorithm) in PAST 4.17, 2024.

Results

Species richness and diversity

Species richness varied substantially among the nine islands, ranging from one species (on four islands) to 11 species on Tarout Island, with a mean of 3.44 species per

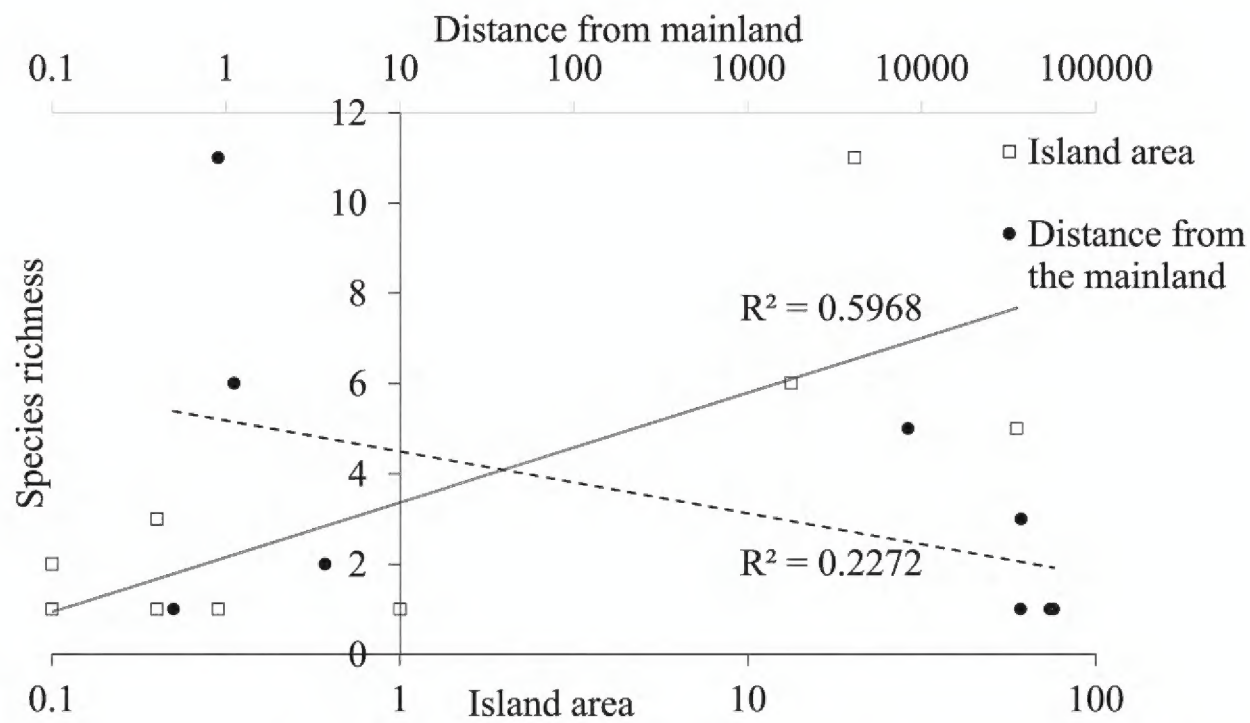

Figure 3. The relationship between reptile species richness with the area and distance from the mainland for nine Saudi islands in the Arabian Gulf (logarithmic scale for area and distance axes).

island. A positive correlation was detected between species richness and island area (Pearson's r = 0.52), while species richness showed a negative correlation with distance from the mainland (r = −0.55) (Fig. 3). Species diversity was highest on Tarout Island (0.152) and lowest (zero) on Al Fanateer, Al-Juraid, Karan, and Kareen (Table 2). The islands ranked from highest to lowest species diversity as follows: Tarout > Abu Ali > Az-Zakhnuniyyah > Jana > Al-Huwaylat > Al Fanateer > Al-Juraid > Karan > Kareen.

Classification based on species presence/absence data identified distinct clusters of islands based on the geographical location of islands and human activity (Fig. 4).

Systematics

Twenty species of amphibians and reptiles were reported during this study, including 12 families (Ranidae, Geoemydidae, Cheloniidae, Gekkonidae, Phyllodactylidae, Lacertidae, Scincidae, Trogonophidae, Boidae, Colubridae, Psammophiidae, and Viperidae). Table 2 shows the number of collected or observed specimens for each island.

Family Ranidae

Pelophylax ridibundus (Pallas, 1771)

Material examined. Observed: Tarout Island, 6 September 2024, irrigation canal.

Remarks. This is a common species observed in irrigation canals around the farms in Tarout Island. It was reported previously from Dharan, Hofuf, and Qatif (Haas 1957, 1961), Al Qatif (Briggs 1981), and Al Qudaih and Al Suhaemeah near Dahran (Aloufi et al. 2023). Currently, seven species of amphibians have been reported from Saudi Arabia, most of which are known from southwestern Saudi Arabia (Balletto et al. 1985; Al-Qahtania and Al-Johany 2018).

Family Geoemydidae

Mauremys caspica (Gmelin, 1774)

Fig. 5A

Material examined. Tarout Island, 6 September 2024, irrigation canal. Juvenile specimens were captured and released.

Remarks. The Caspian Turtle seems to be common in the irrigation canals in Tarout Island. It was previously recorded from Dharan (Haas 1957), Hufof, Al Qatif, and Al Uqayr (Gasperetti et al. 1993). Aloufi (2009) studied the distribution of the Caspian Turtle in eastern Saudi Arabia. He stated that this species was very common and widespread in the Al Hassa region and extends from the northern to the southern and eastern irrigation canals. Its presence in Tarout Island represents introduction by the locals.

Family Cheloniidae

Eretmochelys imbricata (Linnaeus, 1758)

Fig. 5B

Observed. One dead specimen, Az Zakhnuniyyah Island, 30 August 2024. Three turtles were observed swimming around Al-Juraid Island, 28 May 2025.

Remarks. The Hawksbill Sea Turtle was previously observed around Al Jurayd Island (Aloufi et al. 2023). Gasperetti et al. (1993) indicated several nesting sites in the Arabian Gulf on the coast of Saudi Arabia and the United Arab Emirates. Miller (1989) stated that the offshore islands (e.g., Jana Island) of Saudi Arabia are among the nesting sites for this turtle.

Chelonia mydas (Linnaeus, 1758)

Fig. 5C, D

Observed. Seven dead specimens, Abu Ali Island, 3 October 2024. One dead specimen, Abu Ali Island, 30 May 2025.

Table 2. Summary of number of recorded species and species richness in nine Saudi Arabian islands in the Arabian Gulf.

Species	Tarout	Karan	Kareen	Jana	Al Huwaylat	Az Zakhnuniyyah	Al Fanateer	Al Juraid	Abu Ali
Pelophylax ridibundus	10								
Mauremys caspica	11								
Chelonia mydas									8
Eretmochelys imbricata						1		4	
Bunopus tuberculatus				1					1
Cyrtopodion scabrum	6	1	1	1	10				3
Hemidactylus flaviviridis	12								
Hemidactylus persicus	2								
Stenodactylus slevini						3			
Trigonodactylus arabicus						10			
Ptyodactylus cf *hasselquistii*	11								
Mesalina brevirostris					3	1	2		3
Trachylepis tessellata	4								
Heremites septemtaeniatus				1					
Diplometopon zarudnyi	1								
Eryx jayakari						2			
Platyceps ventromaculatus	1								
Malpolon moilensis	1								
Psammophis schokari	1								4
Cerastes gasperetti						3			
Total number of species (richness)	**11**	**1**	**1**	**3**	**2**	**6**	**1**	**1**	**5**
Total number of individuals	**60**	**1**	**1**	**3**	**13**	**20**	**2**	**4**	**19**
Species diversity	**0.152**	**1**	**1**	**0.333**	**0.645**	**0.31**	**1**	**1**	**0.274**

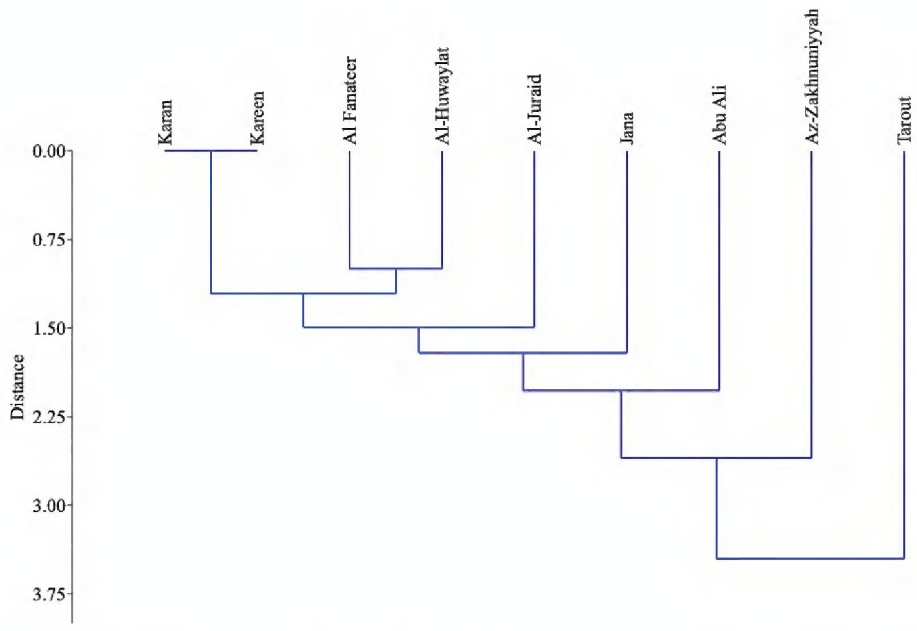

Figure 4. Cluster analysis of nine Arabian islands based on their similarity of herpetofauna.

Remarks. Gasperetti et al. (1993) depicted a map showing the nesting sites in the Arabian Gulf on the coasts of Saudi Arabia and the United Arab Emirates.

Family Gekkonidae

Bunopus tuberculatus Blanford, 1874

Fig. 6A

Previous records. Jana and Abu Ali islands (Martens, 1996).

Observed. Az Zakhnuniyyah Island, 30 August 2024.

Remarks. This is a widely distributed species across arid regions in northern and eastern Saudi Arabia and the Middle East (Arnold 1986; Pola et al. 2024). In eastern Saudi Arabia, it was recorded from Al Jubail (Martens 1996), several localities in Al Hassa (Haas 1957; Al-Sadoon 2010), and Al Qatif (Aloufi et al. 2023). This species prefers sand habitats and becomes active at night.

In the islands of the Arabian Gulf, this species was reported from Auhha Island, Kuwait (Amr et al. 2021), Sir Bani Yas Island in the UAE (Bourquin 2011), and 13 islands in the UAE (Soorae 2004).

Cyrtopodion scabrum (Heyden, 1827)

Fig. 6B

Material examined. IRC 013, Tarout Island–Al Tauos Farm, 15 November 2024. IRC 014, Al-Huwaylat Island, 29 May 2025. KFUPM collection, Jana Island, 15 August 2016. KFUPM collection, 2 specimens, Karan Island, 12 August 2016. KFUPM collection, Kareen Island, 15 August 2016.

Observed. Abu Ali Island, 30 May 2025.

Remarks. The Rough Bent-toed Gecko has a wide range of distribution across the Middle East, reaching the coastal regions of the Red Sea (Sindaco and Jeremčenko 2008). It was reported from several localities in the

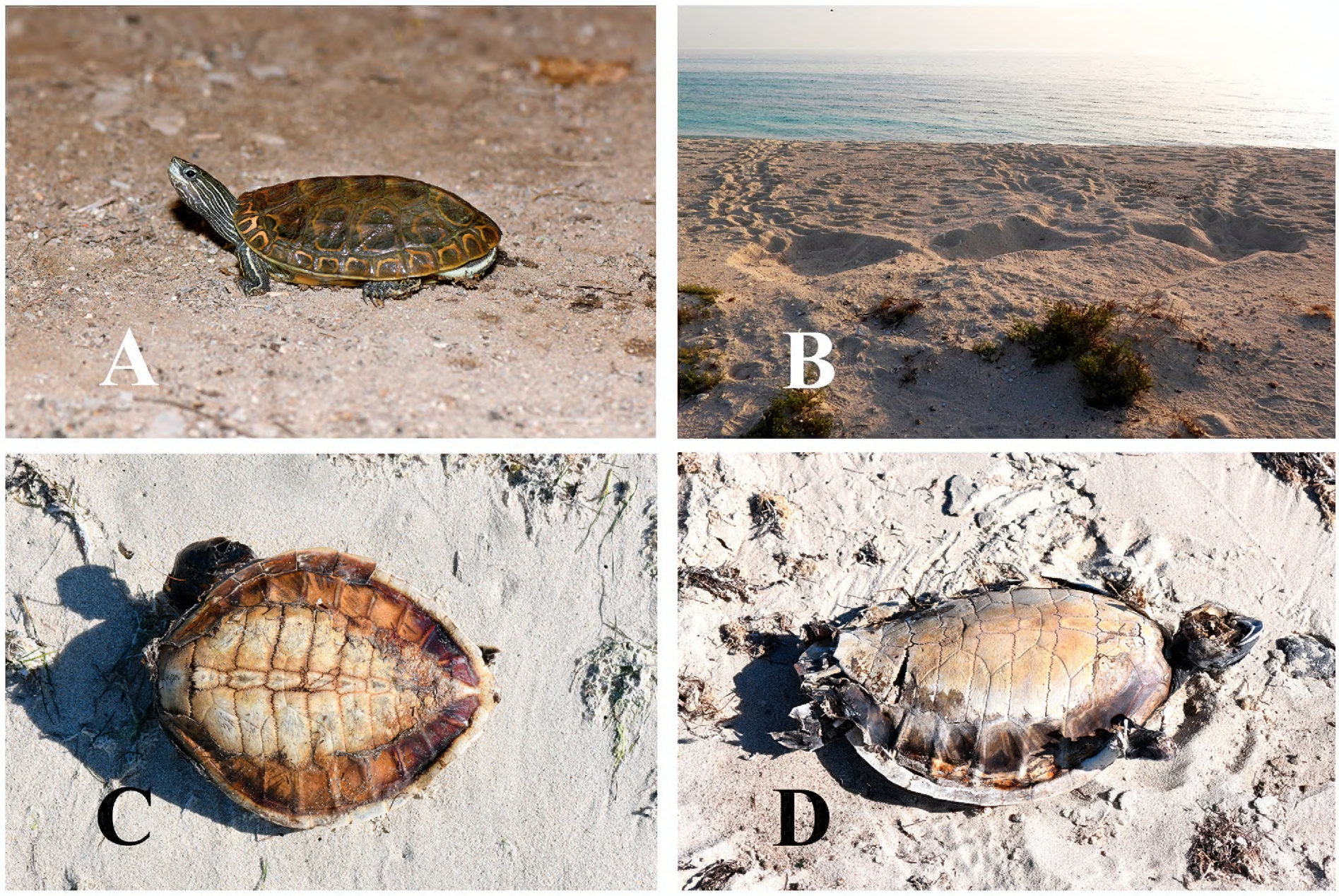

Figure 5. A. *Mauremys caspica* from Tarout Island; **B.** Tracts of *Eretmochelys imbricata* from Al-Juraid Island; **C**, **D.** Ventral and dorsal views of a dead *Chelonia mydas* from Abu Ali Island.

eastern province (Haas 1957; Martens 1996; Aloufi et al. 2023). It is believed this species was introduced by human activities to the Arabian Peninsula (Carranza et al. 2021). It was found along with *Hemidactylus persicus* in agricultural areas in Tarout Island.

In the islands of the Arabian Gulf, this species was reported from Auhha Island, Kuwait (Amr et al. 2021), and Sir Bani Yas, Arzanah, and Zirku islands in the UAE (Soorae 2004; Bourquin 2011).

Hemidactylus flaviviridis Rüppell, 1835

Fig. 6C

Material examined. IRC 008, Tarout Island–Al Halal Farm, 31 August 2024.

Observed. Captured and released, Tarout Island–Al Tauos Farm, 15 November 2024.

Remarks. This species is associated with farms in Tarout Island. The Yellow-bellied Gecko is considered a common species in the eastern region of Saudi Arabia. On the mainland, it was found also in farms near Al Qatif (Aloufi et al. 2023) and on building walls in Al Aba and Al Jubail (Ross 1993; Martens 1996). This species is originally native to central India and was introduced to Africa and Arabia through human activities (Carranza et al. 2021).

In the islands of the Arabian Gulf, this species was reported from Auhha Island, Kuwait (Amr et al. 2021), and Sir Bani Yas Island in the UAE (Soorae 2004; Bourquin 2011).

Hemidactylus persicus Anderson, 1872

Fig. 6D

Material examined. IRC 010, Tarout Island–Sami Farm, 6 September 2024. IRC 012, Tarout Island–Al Tauos Farm, 15 November 2024. Tarout Island–Al Suhaemeah farms, 5 September 2023.

Remarks. Castilla et al. (2013) gave a detailed distribution map for *H. persicus*, covering the Arabian Peninsula and adjacent countries. In Saudi Arabia, its distribution is confined to the Eastern Province (Haas 1957, 1961; Martens 1996; Aloufi et al. 2023).

In the islands of the Arabian Gulf, this species was reported from Sir Bani Yas, Arzanah, and Jernain islands in the UAE (Soorae 2004; Bourquin 2011).

Stenodactylus slevini Haas, 1957

Fig. 6E

Material examined. IRC 003, Az Zakhnuniyyah Island, 30 August 2024.

Remarks. Slevin's Short-fingered Gecko distribution range extends from the eastern Arabian Peninsula, Kuwait, and southern Iraq, reaching as far as the southern deserts of Jordan (Sindaco and Jeremčenko 2008). It was previously reported from Al Hassa and several localities around Al Qatif (Al-Sadoon 2010; Aloufi et al. 2023).

In the islands of the Arabian Gulf, this species was reported from Sir Bani Yas Island in the UAE (Bourquin 2011).

Trigonodactylus arabicus Haas, 1957

Fig. 6F

Material examined. IRC 002, Az Zakhnuniyyah Island, 30 August 2024.

Remarks. The Arabian Sand Gecko was found among salt marshes around Al Zakhnunyah Island. This species is known to occur along eastern and central Saudi Arabia, eastern Arabia including Oman, the United Arab Emirates and Qatar, Kuwait, Yemen, and southern Jordan (Pola et al. 2021). It was previously reported from Al Jubail and Al Qatif in the Eastern Province (Martens 1996; Aloufi et al. 2023). In the islands of the Arabian Gulf, this species was reported from Sir Bani Yas Island in the UAE (Bourquin 2011).

Family Phyllodactylidae

Ptyodactylus cf *hasselquistii* (Donndorff, 1798)

Observed. Tarout Island–Al Tauos Farm, 15 November 2024.

Remarks. Within the Middle East, the taxonomy of this species is problematic. Metallinou et al. (2015) referred to the Arabian populations as the *P. hasselquistii* species complex within two clades, the first referring to populations of western and central Saudi Arabia and Oman, while the second clade includes populations associated with the southwestern mountains of Aseer. It was previously recorded from Al Dharan (Haas 1957), Al Hassa (Al-Sadoon 2010), and several localities in the Eastern Province (Aloufi et al. 2023).

Family Lacertidae

Mesalina sp.

Fig. 6G

Material examined. IRC 001, Az Zakhnuniyyah Island, 30 August 2024. IRC 011, Abu Ali Island, 3 October 2024.

Observed. Al-Huwaylat Island, 29 May 2025. Al Fanateer Island, May 2025.

Remarks. The taxonomy of the *Mesalina guttulata* complex was revised recently by Šmíd et al. (2025). They described a new species, *Mesalina cryptica*, from the Tuwaiq Escarpment near Riyadh. Its distribution extends from Jordan, Saudi Arabia, and Kuwait. Perhaps previous records for *Mesalina brevirostris* reported from several localities around Al Jubail and Jana Island (Martens 1996), Failaka Island, Kuwait (Amr et al. 2021), and 12 islands in the UAE (Soorae 2004) may well represent *Mesalina cryptica*.

Family Scincidae

Trachylepis tessellata (Anderson, 1895)

Fig. 6H

Material examined. IRC 005–006, Tarout Island–Al Halal Farm, 31 August 2024.

Remarks. This species was first recorded from Saudi Arabia by Aloufi et al. (2023) around the Dahran area. The Tessellated Skink is known to occur in Yemen, Oman, and the United Arab Emirates (Carranza et al. 2021). It prefers humid areas among the farmlands in the Eastern Province. This species was reported from Masirah Island, Oman (Carranza et al. 2021).

Heremites septemtaeniatus (Reuss, 1834)

Material examined. KFUPM collection, Jana Island, 15 August 2016.

Remarks. The Southern Grass Skink has a wide distribution range extending from the eastern Arabian Peninsula, Iraq, Iran, Armenia, and southern Turkey (Sindaco and Jeremčenko 2008). It was found in irrigated and shaded areas near Al Jubail, Al Hassa, Hofuf, and Al Qatif in the Eastern Province (Arnold 1986; Martens 1996; Al-Sadoon 2010; Aloufi et al. 2023). This species was reported from Ad Dimaniyat Islands, Oman (Carranza et al. 2021).

Family Trogonophidae

Diplometopon zarudnyi Nikolsky, 1907

Materials examined. Observed: Captured and released, Tarout Island–Al Tauos Farm, 15 November 2025.

Remarks. This species is distributed across western Iran, southern Iraq, and the eastern part of the Arabian Peninsula (Sindaco and Jeremčenko 2008). Zarudnyi's Worm Lizard was reported from several localities along the coastal regions of the Arabian Gulf (Haas 1957, 1961; Martens 1996; Al-Sadoon 2010; Aloufi et al. 2023) and from Abu Ali Island (Martens 1996).

Family Boidae

Eryx jayakari Boulenger, 1888

Material examined. Observed: Az Zakhnuniyyah Island, 13 August 2024. Two specimens were killed by soldiers.

Remarks. Jayakar's Sand Boa is widely distributed across Arabia, including Bahrain, Kuwait, Oman, Saudi Arabia, the UAE, and Yemen (Gasperetti 1988; Carranza et al. 2021). It was recorded from Dhahran and Abqaiq

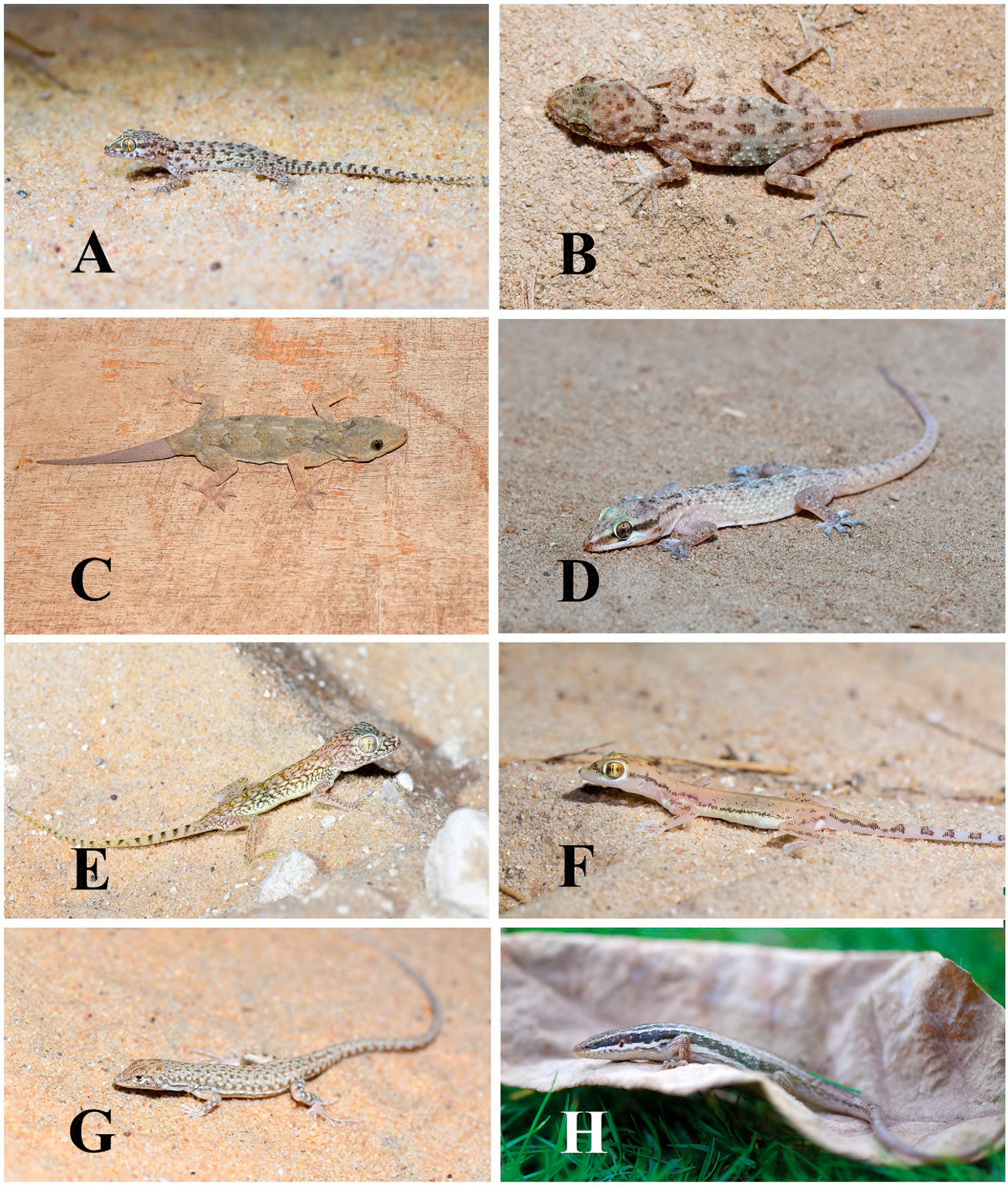

Figure 6. A. *Bunopus tuberculatus* from Al Zakhnuniyyah Island; **B.** *Cyrtopodion scabrum* from Tarout Island; **C.** *Hemidactylus flaviviridis* from Tarout Island; **D.** *Hemidactylus persicus* from Tarout Island; **E.** *Stenodactylus slevini* from Az Zakhnuniyyah Island; **F.** *Trigonodactylus arabicus* from Az Zakhnuniyyah Island; **G.** *Mesalina* sp. from Az Zakhnuniyyah Island; **H.** *Trachylepis tessellata* from Tarout Island.

(Haas 1957, 1961; Leviton and Anderson 1967; Mandeville 1967), Al Jubail (Martens 1996), and the Al Hassa and Al Qatif area (Al-Sadoon 2010; Aloufi et al. 2023). In the islands of the Arabian Gulf, this species was reported from Auhha Island, Kuwait (Amr et al. 2021), and Sir Bani Yas Island in the UAE (Soorae 2004; Bourquin 2011).

Family Colubridae

Platyceps ventromaculatus (Gray, 1834)

Observed. Tarout Island–Al Jmaan Farm, 22 August 2024. Tarout Island–Al Tauos Farm, 15 November 2024.

Remarks. The distribution of Hardwicke's Rat Snake is confined to eastern Arabia, including Kuwait, Saudi Arabia, the UAE, Bahrain, Qatar, and Oman (Gasperetti 1988). This species is common in the Eastern Province, with several records from Al Jubail to Al Hassa (Haas 1957, 1961; Gasperetti 1988; Martens 1996; Al-Sadoon 2010; Aloufi et al. 2023).

In the islands of the Arabian Gulf, this species was reported from Sir Bani Yas Island in the UAE (Soorae 2004; Bourquin 2011).

Family Psammophiidae

Malpolon moilensis (Reuss, 1834)

Observed. Tarout Island–Al Faliah Farm, 6 September 2024. One specimen was killed by farmers.

Remarks. The False Cobra is a common species inhabiting the deserts of Arabia (Gasperetti 1988). In the Eastern Province, it was reported from several localities (Haas 1957; Mandeville 1967; Gasperetti 1988; Al-Sadoon 2010; Aloufi et al. 2023). It was collected from Batina Island near Al Jubail (Martens 1996).

Psammophis schokari (Forsskål, 1775)

Observed. Tarout Island–Al Tauos Farm, 15 November 2024. One specimen was killed by soldiers.

Remarks. Forsskål Sand Snake is a common species known to occur in a wide variety of habitats in Saudi Arabia (Gasperetti 1988). In the Eastern Province, it was previously reported from Dhahran, Qatif, and Jabal Qara (Haas 1957; Gasperetti 1988); the islands around Al Jubail and the Al-Aba oasis (Martens 1996); and several localities in Al Hassa (Al-Sadoon 2010; Aloufi et al. 2023).

In the islands of the Arabian Gulf, this species was reported from Sir Bani Yas Island in the UAE (Soorae 2004; Bourquin 2011).

Family Viperidae

Cerastes gasperettii Leviton & Anderson, 1967

Observed. Az Zakhnuniyyah Island, 20 August 2024. Three specimens were killed by soldiers.

Remarks. The Arabian Horned Viper is a very common species across the sand deserts of the Arabian Peninsula (Gasperetti 1988). In the Eastern Province, it was collected from several localities (Martens 1996; Haas 1957, 1961; Aloufi et al. 2023; Al-Sadoon 2010; Leviton and Anderson 1967). In the islands of the Arabian Gulf, this species was reported from Auhha Island, Kuwait (Amr et al. 2021).

Discussion

The nine Arabian Gulf islands have a varied reptile fauna of 19 species, which makes up about 15% of the total herpetofauna known from the continental mainland of Saudi Arabia. The largest islands, Abu Ali (59.3 km^2), Tarout (20.3 km^2), and Az-Zakhnuniyyah (13.35 km^2), had reptile assemblages of 5, 11, and 6 species, respectively. The three were least similar to the rest of the islands due to their size and long history of anthropogenic use related to development and agricultural activity, which may have played an important role in the dispersal of reptiles across the islands.

The reptile assemblages were influenced by island attributes, mainly size, distance from the mainland, and human activity. In general, reptile species richness increased with island size, as was the case for similar island groups or archipelagos near the mainland. Geographical location was the most important determinant of reptile assemblages on the nine Arabian islands, with similarity in species assemblages decreasing with increasing distance between the islands. Similar patterns have been reported elsewhere.

The colonization for most species recorded in this study may represent human introduction in the case of geckos and lizards. However, records of *C. gasperettii* from Az-Zakhnuniyyah Island and *D. zarudnyi* from Tarout Island may well represent a previous connection of these islands with the mainland. Both islands are in close proximity to the mainland and are very common in the Eastern Province (Aloufi et al. 2023). The Arabian Gulf was a dispersal center for some Iranian and Arabian reptiles about 20,000–30,000 years ago (Mahmoodi 1988). At least three islands were found to host viable populations of marine turtles: Abu Ali Island for *Chelonia mydas* and Al-Juraid and Az-Zakhnuniyyah islands for *Eretmochelys imbricata*. Jana is the most important island for the Green Turtle (Pilcher 2000). Karan, Jana, and Al-Juraid islands are major nesting sites for both species (Al-Merghani et al. 1996, 2000). Further studies should be conducted to monitor the status of breeding of both turtles on these islands and implement conservation measures to protect them.

The greatest species richness was concentrated on Tarout Island, which is the most developed and inhabited island. Tarout Island has the highest number of species, reaching up to 11. This is perhaps due to its close vicinity to the mainland at Al Qatif and the fact that it has been inhabited over the past 200 years. This island is heavily populated, with an abundance of farms and irrigation canals. All species recorded from Tarout Island may very well have been dispersed from the mainland during periods of connection, since they were reported from coastal regions around Al Qatif (Aloufi et al. 2023).

The Saudi Arabian islands in the Arabian Gulf have the highest number of species, including one amphibian and 19 reptiles (Table 2). The number of species per island ranged from one in four islands to 11 in Tarout Island (Table 3). In the UAE, the number of recorded species per

Table 3. Comparison of the herpetofauna recorded from islands in the Arabian Gulf.

Species	Saudi Arabia	Kuwait	Iran	UAE
Pelophylax ridibundus	•			
Mauremys caspica	•			
Eretmochelys imbricata	•			
Chelonia mydas	•	•		
Lepidochelys olivacea		•		
Bunopus tuberculatus	•	•		•
Cyrtopodion scabrum	•	•		•
Hemidactylus flaviviridis	•	•	•	•
Hemidactylus persicus	•		•	•
Hemidactylus robustus				•
Stenodactylus doriae			•	
Stenodactylus slevini	•			•
Trigonodactylus arabicus	•			•
Tropiocolotes hormozganensis			•	
Pristurus rupestris			•	•
Pseudoceramodactylus khobarensis			•	
Ptyodactylus hasselquistii	•			
Trapelus agilis			•	
Phrynocephalus longicaudatus		•		
Acanthodactylus blanfordi			•	
Mesalina watsonana			•	
Mesalina brevirostris	•	•		
Chalcides ocellatus				•
Heremites septemtaeniatus	•			
Scincus conirostris				•
Scincus mitranus			•	
Trachylepis tessellata	•			
Diplometopon zarudnyi	•			
Eryx jayakari	•	•		•
Platyceps ventromaculatus	•			•
Malpolon moilensis	•			
Psammophis schokari	•			•
Cerastes gasperettii	•	•		
Hydrophis platurus		•		
Total	**19**	**10**	**10**	**13**

island varied from as low as one on Al Yasat North Island to as high as 13 on Sir Bani Yas Island (Soorae 2004; Bourquin 2011). Species recorded from the UAE islands but not found in the Saudi Arabian islands include *Hemidactylus robustus*, *Pristurus rupestris*, *Stenodactylus arabicus*, *Chalcides ocellatus*, and *Scincus conirostris* (Soorae 2004; Bourquin 2011), and those from Kuwait include *Lepidochelys olivacea*, *Phrynocephalus longicaudatus*, and *Hydrophis platurus* (Amr et al. 2021). Species reported from Qeshm Island included 10 species, whereas seven species (*Scincus mitranus*, *Trapelus agilis*, *Pristurus rupestris*, *Acanthodactylus blanfordi*, *Mesalina watsonana*, *Pseudoceramodactylus khobarensis*, and *Tropiocolotes nattereri* [=*Tropiocolotes hormozganensis*]) were not recorded from the Saudi islands, whereas the latter is considered endemic to southwestern Iran (Hosseinian Yousefkhan et al. 2013).

The water level in the Arabian Gulf has been subjected to several changes during the Quaternary, and it is believed that during this period there were connections between the islands and the mainland (Mahmoodi 1988). This may explain the presence of snakes and large lizards such as *Trachylepis tessellata*, *Chalcides ocellatus*, and *Heremites septemtaeniatus*. Geckos are associated with human-related activities, such as construction of infrastructure, movement of construction materials, and transport of trees from the mainland, which may very well be transferred to many islands. According to Soorae (2004), most species on the UAE islands represent introductions by human activities.

So far, no endemic species have been reported from the islands of the Arabian Gulf. On the other hand, two endemic species were reported from the Farasan Archipelago: *H. farasani* from Farasan Island (Šmíd et al. 2023) and *P. insulanus* from Sarso Island (Mertens 1965). The archipelago was formed by fossilized coral reefs that were raised up to 70 m above sea level due to an expanding salt dome formed in the late Miocene salinity crisis about 6–5.3 MYA (Fernandes et al. 2006). Also, the largest islands are about 50 km from the mainland. This perhaps led to the evolution of some reptiles in the archipelago; however, some other species known from the mainland were also reported from Farasan Island, such as *Eumeces schneiderii*, *Hemidactylus flaviviridis*, *Pristurus flavipunctatus*, *Ptyodactylus hasselquistii*, *Mesalina austroarabica*, *Trachylepis brevicollis*, *Psammophis schokari*, and *Echis borkini* (Schätti and Gasperetti 1994; Cunningham 2010; Masseti 2014; Smid et al. 2025).

Elsewhere in the Arabian Sea, the reptiles of the Socotra Archipelago have the highest number of endemic species, with 29 out of 31 considered endemic (Razzetti et al. 2011; Sindaco et al. 2012). Despite their relative proximity to Eastern Africa, these species showed relatedness mainly to the Arabian mainland (Gómez-Díaz et al. 2012; Garcia-Porta et al. 2016; Sindaco et al. 2012; Simó-Riudalbas et al. 2019; Tejero-Cicuéndez et al. 2021). This archipelago evolved geologically during the Eocene epoch, about 40 MYA. It is about 370 km from the Yemeni landmass. In Masirah Island, Oman, two endemics have been reported (see Carranza et al. 2021): *Hemidactylus masirahensis* (Carranza and Arnold 2012) and *Pristurus masirahensis* (Tamar et al. 2019).

The analysis of biodiversity patterns on islands is central to the study of vertebrate biogeography through the dynamic equilibrium between species colonization, extinction, and speciation (McArthur and Wilson 1967; Whittaker and Fernández-Palacios 2007). Recent studies have also added the complex of factors of human influence and climate that influence species distribution on islands (Whittaker and Fernández-Palacios 2007; Capinha et al. 2020). The present dataset for the reptile fauna in the Arabian Gulf islands provides a key resource for biogeographical analyses and conservation studies. Nevertheless, further studies should be undertaken to compare the taxonomic identity of these species with populations from the mainland and to understand the interplay between natural and human-driven processes that lead to their colonization of the islands (Silva-Rocha et al. 2019; Bonardi et al. 2022).

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